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Science and Technology Perspectives

DEVELOPMENTS

Joint Polar Study (Poland/Argentina) The ninth Polish-Argentine Antarctic research expedition is being conducted this summer under the sponsorship of the Polish Academy of Sciences. Earlier in the season, the team explored the Palmer Archipelago as part of its expedition through western Antarctica. (Warsaw PAP 30 May 86) STAT

Aerospace (FRG/PRC) MBB (Messerschmitt Boelkow Blohm) has signed an agreement with the PRC Aviation Ministry to cooperate on the production of the MPC 75 commuter aircraft that will be equipped with propfans. (Duesseldorf HANDELSBLATT 23-24 May 86, 9 Jun 86) STAT

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FEATURE ARTICLES

REPORTS

PERSPECTIVES selections are based solely on foreign press, books and journals, or radio and television broadcasts. Some of the materials used in this publication will appear as abstracts or translations in the FBIS serial reports. Comments and queries regarding this publication may be directed to the Center Chief, to individuals at the numbers listed with items, or to the Science and Technology Center at

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DEVELOPMENTS

DEVELOPMENTS highlights worldwide S&T events in the foreign media. Items followed by an asterisk will be published by FBIS. The contributor's name and telephone number are provided.

Computers

(FRG/PRC) In competition with US, Japanese, and other European companies, Siemens won a DM 50 million computer order from the PRC—the largest ADP order so far. Siemens will provide 36 personal computers and training for 70 persons at 18 Chinese universities. (Duesseldorf HANDELSBLATT 23-24 May 86, 9 Jun 86)* STAT

(France) Citing high costs, Bull has withdrawn from the Marisis supercomputer project. Marisis was to have been a combination of Bull's "Isis" processor and Cimsa/Sintra's "Marie" computer. The loss of Bull will delay the project by one to two years and has left Cimsa/Sintra, a Thompson subsidiary, as prime contractor. Cimsa/Sintra plans to continue developing its part of the Marisis project and will compensate for the loss of the "Isis" processor by linking several "Maries" in a network. (Paris LE MONDE INFORMATIQUE 2 Jun 86)* STAT

Electronics

(Italy) To strengthen its domestic market position against US and Japanese competition in semiconductors, the Italian microelectronics manufacturer SGS has launched a marketing and R&D strategy called "Objective: Italy." A key feature of this strategy is the development of a computer network that will transfer technology and know-how from SGS CAD (computer-aided design) to Italian research laboratories, universities, and other major customers. (Milan AUTOMAZIONE, ENERGIA, INFORMAZIONE Apr 86)* Milan STAT

Enzyme Switches

(UK) Britain's leading chemical company, ICI, has committed 150 million pounds for long-term plant research dealing with enzyme switches for combating pests and diseases, gene probes for virus disease identification, and shorter breeding programs for new crop strains that would also make their own fertilizer and repel predators. (Frankfurt/Main FINANCIAL TIMES 26 Jun 86) STAT

Esprit VLSI Project

(European Commission) The EC has promised its support, through the AIDA (Advanced Integrated Circuit Design Aids) project, to Siemens, ICL, and Thompson for a joint study of computer-aided design tools for VLSI circuits. The AIDA project is the largest ESPRIT project to date. The three companies, together with the EC, are contributing some 80 million guilders. In addition, they will receive technical support from the University of Manchester, the Bull Research Center, and the University of Grenoble. (Amsterdam COMPUTABLE 2 May 86) Antwerp/ STAT

French Experiments on Soviet MIR

(France/USSR) Matra has joined Roussel-Uclaf in preparing orbital electrophoresis experiments; interferon is undoubtedly involved. The first test could come as soon as 1988 onboard the Soviet MIR space station. (Paris L'USINE NOUVELLE 19 Jun 86) Antwerp/ STAT

Nuclear Reactors

(USSR) New steels with a service life of 50 years must be developed for larger water-water reactors. To achieve this, Academicians I. V. Gorykin and Yu. I. Zvezdin state that progress must be made in developing larger presses for forging great thicknesses of steel and in finding better methods for purifying and alloying steel. (Moscow VESTNIK AKADEMII NAUK SSSR No 3, Mar 86 pp 37-46) STAT

Space Research

(Poland) Poland will take part in meteorology projects as part of the Interkosmos space program, according to Wlodzimierz Buryjak, Polish representative to the latest Interkosmos working group in Havana. Polish experts will develop ways of processing satellite data on temperature, humidity, and amounts of atmospheric ozone. (Warsaw PAP 16 Jun 86) STAT STAT

Submicron Chips

(FRG/France/Netherlands) Europe's three semiconductor leaders—Siemens, Thompson, Philips—have initiated Joint European Silicon Submicron, a $1.5 billion, 10-year research plan to identify and develop key designs and technologies to compete with the United States and Japan. (Frankfurt/Main FINANCIAL TIMES 25 Jun 86) STAT

Submicron Circuit Technology

(France) Using techniques developed by LETI (Laboratory for Electronics and Data Processing Technologies), a Thompson subsidiary, Eurotechnique plans to introduce HCMOS (high-density CMOS) IV technology for VLSI production by 1989. The method will permit circuit detail of 0.8 microns. (Paris L'USINE NOUVELLE 19 Jun 86) Antwerp/ STAT

Technology Transfer

(USSR/Finland) A temporary committee has been set up to work out the details of the Soviet-Finnish space collaboration agreement signed on 4 June. Finland is to provide equipment for the Phobos probe and the Interball satellite. Furthermore, within CEMA, the agreement could spark new research on industrial robots, powder metallurgy, plasma deposition, sputtering, superconductivity, monoclonal antibodies and laser applications. (Helsinki TIEDONANTAJA 5 Jun 6) STAT

Robotics

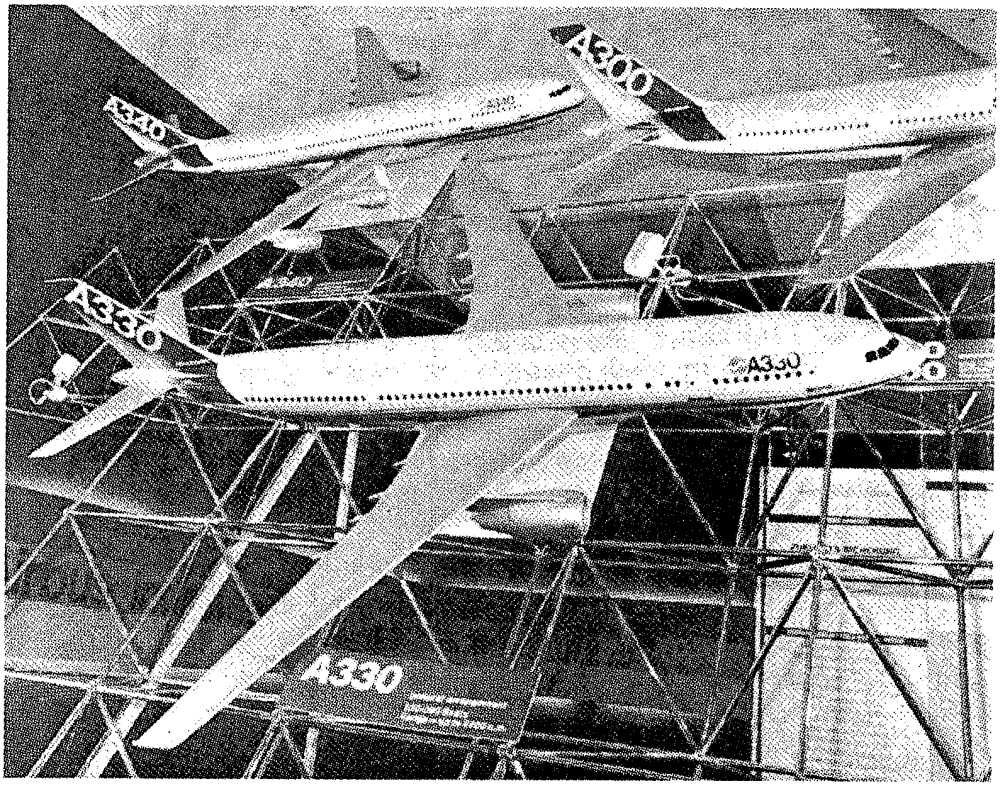
(PRC) The Shenyang Institute of Automation, which has imported underwater robot manufacturing technology from Perry Offshore, Inc., is constructing the country's first robot research and development center, which will have a floor space of 40,000 square meters and, by 1990, a research staff of 400. According to the Institute's director, the center's main task will be to develop special-purpose robots, including underwater robots capable of operating at depths of 300-600 meters. The center will also conduct the basic research necessary to develop remote-controlled robots capable of working in coal mines or underwater at a depth of 2,000 meters. (Beijing XINHUA 31 Jan 86)* STAT

WEST EUROPE: AIRBUS INDUSTRIE-MCDONNELL DOUGLAS TALKS

Key Points: European press reports point to conflict in Airbus Industrie-McDonnell Douglas discussions and indicate that the two sides are not close to an agreement on joint development of commercial aircraft.

On 14 June the Paris weekly AIR & COSMOS reported that Airbus Industrie had received a proposal from McDonnell Douglas for cooperation involving "two- and three-engine long-range transports." The Hamburg daily DIE ZEIT of 20 June reported that during the 12 June meeting of the Airbus Industrie consortium, Martin Gruener, Parliamentary State Secretary in the Federal Ministry of Economics, unexpectedly disclosed that Airbus Industrie had received the McDonnell Douglas offer and that talks had been under way for three months.

According to DIE ZEIT, the McDonnell Douglas proposal calls for cooperation in Airbus Industrie's A330/A340 and McDonnell Douglas' MD-11 projects. Specifically, the proposal stipulates that Airbus abandon the long range A340 to participate in the MD-11 project. For its part, McDonnell Douglas would supply MD-11 wings for the medium-range A330. As an additional lure for Airbus, McDonnell proposed the joint development of a model to compete with the Boeing 747. AIR & COSMOS of 21 June described this model as a 450-seat, three-engine aircraft called the AM-450.



DIE ZEIT reported that Airbus Industrie has rejected this approach and participating European governments are determined to stick by the A330/A340 project. In addition, one Airbus Industrie manager was quoted in DIE ZEIT as saying that any agreement would have to include the smaller, competing A320 and MD-80 models. Gruener has stressed that the Airbus program will not be delayed by talks with McDonnell Douglas. According to the FINANCIAL TIMES of 4 July, Airbus Industrie counterproposals call for McDonnell Douglas to abandon the MD-11. In the latest round of talks Airbus Industrie has suggested that McDonnell Douglas develop a larger version of the MD-11, seating around 380 passengers, as competition for the Boeing 747 and that Airbus and McDonnell pool their resources on a new generation of aircraft to complement the A320. The FINANCIAL TIMES observes that while both companies agree on the strategic goal of competing with Boeing, strong differences exist as to how this collaboration should work. In addition, one Airbus Industrie manager was quoted in DIE ZEIT as saying that any agreement would have to include the smaller, competing A320 and MD-80 models.

A communique issued after the 12 June meeting expressed concern that—as on previous occasions when Airbus was planning new models—the American objective was to undermine the new program. DIE ZEIT observed, however, that the European consortium at present enjoys a stronger position in aircraft sales than McDonnell Douglas. In light of this, the Europeans view the offer with skepticism. "We smell a rat," said one Airbus Industrie representative. DIE ZEIT commented that the important thing to McDonnell Douglas is to keep the DC 10 production line going and in the European view, the McDonnel Douglas proposal itself lends credence to this skepticism.

DIE ZEIT commented that although Airbus Industrie views the McDonnell Douglas proposal as a disruptive maneuver, it does afford the opportunity for a mutually beneficial partnership. For Airbus Industrie such cooperation would offer the opportunity to gain a better foothold in the US market.

(A translation of the sources cited in this article will appear in the JPRS serial EUROPE REPORT: SCIENCE AND TECHNOLOGY.)

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JAPAN: 1M DRAM PRODUCTION BEGINS, 4M DRAM DEVELOPMENT IN PROGRESS

Key Points: Eight major Japanese semiconductor manufacturers will soon begin to mass produce one-megabit dynamic random access memory (1M DRAM) chips, which may result in severe price-cutting later this year. Meanwhile, three manufacturers have announced the successful development of 4M DRAM technologies for possible mass production in 1988 or 1989. Although not yet disclosed, two other manufacturers may have succeeded in developing 4M DRAM technologies.

Recent Tokyo press reports indicate that Japanese semiconductor manufacturers will soon launch full-scale mass production of one-megabit dynamic random access memory (1M DRAM) chips. According to NIKKAN KOGYO SHIMBUN on 22 May, Fujitsu, NEC, Hitachi, Mitsubishi Electric, Matsushita Electronics, Sharp, and Oki will soon join Toshiba in mass production of 1M DRAM devices. Toshiba, according to NIKKEI BUSINESS on 28 April, started mass production of 1M DRAM devices in March and now produces 300,000 chips per month. According to NIHON KEIZAI SHIMBUN on 7 May, Japanese semiconductor manufacturers hope for a rise in demand because IBM has started selling its general-purpose "3090" mainframe equipped with 1M DRAM chips.

The press indicates that the Japanese manufacturers will be producing a few million 1M DRAM chips per month later this year or early next year. According to DEMPA SHIMBUN on 26 May, Toshiba plans to increase its monthly production to 1 million chips by the end of 1986. Sharp, according to NIHON KEIZAI SHIMBUN and NIKKEI SANGYO SHIMBUN on 10 May, will begin production at Fukuyama with sample shipments in August and mass production of 1 million units per month starting in April 1987. The 22 May NIKKEI SANGYO SHIMBUN says that Mitsubishi Electric will start sample production of 1M DRAM chips at its Saijo plant in June and will increase monthly output to 100,000 units per month this fall. NIHON KEIZAI SHIMBUN on 6 May reports that Hitachi will start mass production in July at a monthly rate of 40,000 to 50,000 at its Mohara and Musashi plants. The same source reports that NEC plans to start mass production later this year or early next year. As NIKKAN KOGYO SHIMBUN reports on 22 May, Fujitsu, which started sample shipment of 1M DRAMs at the same time as NEC and Hitachi late last year, will also start mass production soon. NIKKAN KOGYO SHIMBUN on 22 May also reports that Oki and Matsushita Electronics will start sample shipments this summer and mass produce shortly thereafter.

NIHON KEIZAI SHIMBUN of 6 May forecasts that severe price-cutting in the 1M DRAM market may be triggered by mass production later this year or early next year. According to the press, chip prices began to fall as soon as major semiconductor manufacturers started to announce their mass production plans. As NIHON KEIZAI SHIMBUN of 7 May reports, the price of a sample 1M DRAM had stood for some time at 5,000 to 8,000 yen, still more than 10 times the price of a 256-kilobit random access memory. The same source indicates, however, that some semiconductor manufacturers are now quoting prices below 5,000 yen.

As widely noted in the press, the memory capacity of the large-scale integrated circuits (LSIs) has quadrupled every three years. This rule will probably apply also in the case of 1M DRAM and 4M DRAM development and production. As the industry proceeds toward mass production of 1M DRAMs in 1986-1987, development of the next-generation 4M DRAM chip is under way for possible mass production in 1988-1989. Recent Tokyo press reports indicate that three manufacturers have announced their successful development of 4M DRAM technology. The March issue of NIKKEI MICRODEVICES and the April issue of DENSHI GIJUTSU report NEC and Toshiba's announcements of prototype 4M DRAM chips at the 1986 International Solid-State Circuits Conference (ISSCC) in mid-February. On 28 May NIKKAN KOGYO SHIMBUN reports that Mitsubishi Electric announced its new 4M DRAM technology.

In addition to these three manufacturers, Hitachi and Fujitsu may have already developed 4M DRAM technology. NIKKAN KOGYO SHIMBUN reports on 25 February that industry observers were surprised that these two manufacturers, which have the same technological expertise as NEC and Toshiba, did not announce their 4M DRAM technology at the ISSCC. The April issue of SEMICONDUCTOR WORLD comments that these two companies may be withholding announcement of their successful development of 4M DRAM technology in order not to alarm US competitors, since mass production would be a few years away.

The press says that, unlike the 1M DRAM market, with eight potential Japanese manufacturers, the 4M DRAM market may not allow any more than these five participants. The April 1985 issue of TOSHI KEIZAI states that some of the smaller Japanese manufacturers may not be able to remain competitive because of the fast replacement cycle and because they are at a relative disadvantage in capital investment potential and technological capability. NIKKAN KOGYO SHIMBUN forecast on 25 February that only five or six Japanese semiconductor manufacturers could survive in the 4M DRAM race.

The 4M DRAM technologies disclosed by the three Japanese manufacturers are radically different in their approach, according to the NIKKEI MICRODEVICES, DENSHI GIJUTSU, and NIKKAN KOGYO SHIMBUN. The only technology common to all three is the trench capacitor. NEC's prototype is an NMOS device. The chip integrates 9.2 million elements such as transistors and capacitors on one 6.2 mm x 16 mm microchip. Its architecture is 4 megawords x 1 bit. It has a pattern rule of 0.8 microns, three-layered wiring consisting of the two-layered polyside and one-layered aluminum wiring and a new breakthrough memory cell technology. It adopts polysilicon buried in the trench as the storage electrode of the cell capacitor. Its standard access time is 95 nanoseconds, according to these sources.

SEMICONDUCTOR WORLD says that the Toshiba 4M DRAM chip employs a modified 1M DRAM trench capacitor. The device is CMOS in all its circuits except memory cells. It comes in two variations—4 megawords x 1 bit and 1 megawords x 4 bits structure. The chip uses a 1-micron rule, has 8.7 million elements, and a chip size of 7.84 mm x 17.48 mm. The standard access time is 80 nanoseconds.

The Mitsubishi device, with no prototype as yet, according to DEMPA SHIMBUN and NIHON KOGYO SHIMBUN on 28 May, will adopt a new memory cell structure. The new memory cell has trenches 1 to 1.5 microns in diameter and 3 to 4 microns deep. The insides of the trenches are first covered with boron, using a chemical vapor deposition process. They are then covered with phosphorus film, using a diffusion furnace. The two layers form a P-N junction, reduce the distance between cells, and minimize software errors.

None of these 4M DRAM chips have yet been perfected, the press says, pointing out that circuit configuration and fabrication processes will have to be refined before mass production can begin in 1988-1989.

(Translations of selected articles cited above will appear in JAPAN REPORT: SCIENCE AND TECHNOLOGY.)

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USSR: COMPUTERS
MEDICINE

Key Points: Computers are being used in Soviet medicine and the public health sectors for a variety of purposes, but without apparent integration of the parts into an efficient whole. They aid physicians in the clinic, in the laboratory, and at various institutes. A few not very complex diagnostic systems are in place. From the evidence presented so far in the Soviet press, integrated use of computers in a large-scale effort such as the mass screening program is at least two years away.

The use of computers in Soviet medicine currently ranges from the processing of clinical test data to rudimentary expert systems for diagnosis. Most interesting from a public health point of view is the proposal to use computers in what the Soviets call "dispensarization," the plan to get every Soviet citizen into the clinic once a year in a large-scale medical screening program.

Use of computers to implement the USSR's mass screening program was proposed by Dr. Kirill P. Ivanov, doctor of medical sciences and professor at the Institute of Physiology imeni I.P. Pavlov in the 9 October issue of SOVETSKAYA ROSSIYA. In one and a half to two years, he believes, a computer system to give rapid indication of the physiological state of the patient based on biochemical blood analyses could be developed by a fairly small group of mathematicians, programmers, and physicians working together. A data base is already being built by a group of therapeutic institutes under the direction of the Main Administration of Public Health of Lengorispolkom (the Leningrad Municipal Executive Committee).

Hardware for such a system is already available, as PRAVDA reported on 6 February. Serial production of the new "Gamma" computer system by the Elektropribor production association in Cheboksary has begun. This system is specifically designed for complex medical diagnostic systems. This system or one like it might be used in the mass screening program.

Computerized medical diagnostic centers are beginning to be developed at large industrial enterprises, according to IZVESTIYA on 5 February. Automation of patient charts saved 40 percent of the average doctor's time and shortened the time required for mandatory physicals from four-five days to two-three hours per patient. There are eight of these centers in the USSR at this time, three in the RSFSR and five in the Ukraine. Since these centers cost several hundred thousand rubles in equipment alone, the IZVESTIYA correspondent felt that large-scale enterprises were more likely to establish them than rayon or city polyclinics.

An early attempt to integrate medical data for clinical evaluation of a patient is the computerized diagnostic system developed in 1981 at the Arkhipo-Osipovka Sanatorium, which was described in the Soviet public health journal SOVETSKOYE ZDRAVOOKHRANENIYE in January of 1986. One program analyzes EKGs at the rate of more than 20 per hour and runs on an Elektronika-60 microcomputer. A second program processes data from both clinical tests (such as spirography) and standard psychological tests. The Elektronika-60 uses magnetic tape memory and punched tape input and output.

Computers are already being used to aid the physician in prognosis and treatment of trauma, especially shock trauma, at the Lenin Scientific Research Institute of Emergency Medicine. An article in the 25 December 1985 issue of IZVESTIYA reported that blood pressure, temperature, and pulse data are fed into the computer, enabling the physician to save valuable time in choosing a course of treatment.

Pre-screening computer questionnaires are given to patients at the Kuybyshev Medical Institute, according to the newspaper TRUD on 14 February. These questionnaires cover medical history, current illnesses, functional disorders and current symptoms, as well as personal health habits and stress factors at home and at work, all in the form of 48 yes/no questions. The computer produces its "diagnosis" in 20 seconds and was reported accurate in a physician-controlled test of 2,000 workers at the Kuybyshev Zavod imeni Maslennikov Production Association.

(Translations or abstracts of the above sources have appeared or will in the USSR REPORT: LIFE SCIENCES.)

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EDUCATION

Key Points: The Soviets are eager to implement computer education. They appear to be making progress in their attempt to either purchase or manufacture one million 8-bit personal computers by 1990 for use in schools. According to a corresponding member of the Academy of Pedagogical Sciences, however, the Soviets have made no significant progress in computer-aided education over the past 20 years because of their disregard for the modern theory of learning and education.

The 27th CPSU Congress stressed the importance of the development and massive adoption of modern computer technology in the Soviet Union. The September 1985 All-Union Conference on the psychology of computerization at Moscow State University also devoted a significant amount of time to computerization in schools and the psychological problems of using computers, according to VOPROSY FILOSOFII. The 300 participants at the conference included psychologists, philosophers, sociologists, economists, and computer specialists. The conference stressed the need to develop a psychological basis for the effective use of computer technology and the role of computers in man's intellectual development.

The papers presented at the All-Union Conference focus on psychological aspects of artificial intelligence, sociological-psychological research on computer users, problems of modeling dialog on a computer, verbal interaction with a computer, and the development of teaching programs and languages for computer operators. V. M. Monakhov, a corresponding member of the Academy of Pedagogical Sciences, also evaluated US computerized teaching methods in his paper, "Problems in the Computerization of Teaching."

At the All-Union Conference, N. F. Talyzina, another corresponding member of the Academy of Pedagogical Sciences, presented a paper, entitled "Scientific Basis for Computerization of Education." The paper was subsequently published in VESTNIK MOSKOVSKOGO UNIVERSITETA: PSIKHOLOGIYA (No 1, Jan-Mar 86). In her paper Talyzina describes the status of Soviet computerization in schools and criticizes the lack of significant improvement in computer-aided education.

Talyzina says that computerization in Soviet schools has been developing along two lines: teaching the student to communicate with computers, and using computers as an educational tool. Student-computer interaction removes the psychological barrier in the student and produces a modern labor force with computer skills. The second goal would aid all areas of student learning.

The Soviets appear to be making serious efforts in pursuit of the first objective. As we reported in the 30 June issue of SCIENCE AND TECHNOLOGY PERSPECTIVES (Vol. 1, No. 4), the Soviets are trying to acquire one million 8-bit personal computers by 1990 for use in schools. The leading Japanese economic journal, NIHON KEIZAI SHIMBUN, reported on 14 April that the Soviets have asked the Japanese to sell them more than one million computers. A recent item in ASAHI EVENING NEWS on 27 June, however, indicates that the Soviets may be contemplating manufacturing rather than purchasing all the computers from the Japanese. Boris N. Naumov, director of the Information Research Institute at the USSR Academy of Sciences, told the ASAHI SHIMBUN that the Soviet Union plans to produce about one million personal computers by 1990. NIHON KEIZAI SHIMBUN on 22 April and JAPAN ECONOMIC JOURNAL on 10 May also report that the Soviets are making a purchase inquiry to a Japanese firm on a class-1,000 clean room worth 500 million to 1 billion yen, probably in preparation for manufacturing electronic chips for computers.

With regard to the objective of developing computer-aided education, Talyzina criticizes the lack of significant improvement in the efficiency of the educational process. Talyzina states that the Soviet Union has over 20 years of experience in computer-aided education. She says, however, that in the Soviet Union computers have been adopted without taking into account the achievements of the modern theory of learning and education. She blames this on the faculty of VUZs, who implemented computerization without the necessary psychological and educational training.

Talyzina's paper proposes that a model of the education process be developed and a system of necessary technical means for implementing various steps of the process be drawn up based on the modern theory of education and learning. Her proposals for introducing computers into the Soviet educational process, however, seem modest in comparison with state-of-the-art computer-aided education in the West. Talyzina proposes that computers be used to help the teacher explain and demonstrate, organize and monitor the student's activity, assist the student in auxiliary activities such as numerical calculation, and compile and present assignments in proper order.

(Translations of the Soviet sources cited in this article will appear in USSR REPORT: SCIENCE AND TECHNOLOGY POLICY.)

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REPORTS

REPORTS surveys research trends in articles and books on a particular field of science and technology. It also includes summaries and listings of articles and books which may serve as potential sources for future research. Conference proceedings will also be presented occasionally in this section.

USSR: OCEAN BOTTOM GEOLOGY PAPERS REVIEWED

GEOLOGICHESKIY ZHURNAL (May-June 1986) reviewed under the title of "Geological and Geographical Studies of the Atlantic Ocean Bottom" a series of papers by several Soviet scientists. The reviewer says that these papers have made a great contribution to studying Atlantic Ocean geologic structures, to developing theoretical geology, and to strengthening the raw mineral base of the USSR.

According to the reviewer, these articles have become the reference guide for planning specialized geologic-geophysical expeditions of the Ukrainian Academy of Sciences. They will be a foundation for all subsequent investigations. This series has gained wide recognition and been nominated for a State Prize, which the reviewer claims its authors deserve.

These ocean bottom studies contain a set of 15 color geologic-geographic maps which received high praise from the scientific community. According to the reviewer, they reflect various geologic processes and provide an all-embracing and detailed evaluation of the Atlantic Ocean bottom. They can be used in planning and conducting oceanographic expeditions, in zoning the Atlantic according to its physical properties, and in prognoses of mineral resources.

In addition, the series includes works on the following aspects of the Atlantic Ocean bottom: types of sediment, geomorphology, sediment accumulation, basin sediment origin, and sediment geochemistry (carbonates and silica). New concepts on the decisive role of geochemical barriers and boundary zones in sediment origin and ore formation are proposed and developed.

The reviewer says that the number of Soviet works on the geologic structure and development of oceans and seas, as well as on mineral resource prospecting in oceans and seas, has increased greatly "in light of Party and Government decisions." These "decisions" may concern several practical tasks for whose performance this collection of investigations provides a solid scientific base, such as the exploration and mining of mineral resources. The ideas and generalizations described in the papers present the means both to predict processes of ore accumulation in contemporary seas and oceans and to reconstruct past oceanic conditions.

Furthermore, the review comments, the observations reported in the series are fundamental to zoning the Atlantic Ocean according to density, speed of sound, and porosity, and according to the coefficients of sound reflection and dispersion by ocean bottom. The results of these investigations may be used to plan the long-range direction of scientific research related to the physical parameters of sea and ocean bottoms, the review says.

(An abstract of the above source will appear in USSR REPORT: EARTH SCIENCES.)

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USSR: RECENT SOVIET BOOKS DEALING WITH NUCLEAR POWER PLANTS

The following titles complete the selected bibliography on Soviet nuclear reactors, partially published in the previous issue of SCIENCE AND TECHNOLOGY PERSPECTIVES (30 June 1986, Vol. 1, No. 4).

1. DESIGN OPTIMIZATION OF RELIABILITY OF EMERGENCY SYSTEMS IN NUCLEAR REACTORS

The book deals with the issue of assuring safety in design and operation of nuclear reactors. Specific discussions relate to present methods of producing requirements for reliability of emergency systems, actual production of the systems, their operation and maintenance. (Moscow "Raschet I Optimizatsiya Nadezhnosti Sistemy Avariynoy Zashchity Yadernykh Reaktorov" by I. I. Malashinin and A. I. Pereguda, in Russian 1985, 112 pp)

2. COLLECTION OF ARTICLES ON NUCLEAR POWER PLANT SAFETY STANDARDS

The book deals with safety requirements applicable to welding and surfacing various joints in construction of nuclear power plant equipment. (Moscow "Sbornik Normativnykh Materialov po Bezopasnosti AES" by N. V. Beskrestnov and V. I. Konov, Compilers, in Russian 1985, 144 pp)

(Translations of the tables of contents, annotations, and introductions to the books cited above will appear in USSR REPORT: ENGINEERING AND EQUIPMENT.)

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FRANCE: RESEARCH BUDGET CUTS SIGNAL POLICY CHANGES

Recent French press reports discuss cuts in France's 1986 national research budget, changes in the supervision of large national research agencies, and shifts in French scientific research policy.

Budget

LE MONDE of 28 May reported that a government decree of 17 April 1986 canceled Fr 2.2 billion in scientific research appropriations. The budgets of ANVAR (The National Agency for the Implementation of Research) and of the "Fonds de la recherche et de la technologie" (Research and Technology Funds) are affected the most. As a result, scientific research appropriations for 1986 are 4 percent lower than in 1985—the first time since 1981 that the budget has declined over a previous year. Indeed, according to the June issue of LA RECHERCHE, "scientific research will absorb the largest share of the 1986 budget cuts adopted by the new government." LE MONDE points out that the French government traditionally has financed 22 percent of the country's scientific research, amounting to Fr 12 billion a year.

SCIENCES & AVENIR's June issue provides additional details on the 1986 budget cuts. Specifically, the CNRS (National Center for Scientific Research) will lose Fr 710 million in payment appropriations and Fr 230 million in program authorizations, the CEA (Atomic Energy Commission) budget will be cut by Fr 235 million, INSERM (National Institute of Health and Medical Research) funds will be reduced by Fr 180 million and INRA (National Institute of Agricultural Research) will lose Fr 210 million in payment appropriations and Fr 57 million in authorizations.

Organizational Changes

In addition to absorbing large budget cuts, the scientific research community is undergoing organizational changes. The supervision of the CNES (National Space Studies Center), the CNET (National Telecommunications Studies Center), the AFME (French Agency for Energy Management), the CEA and ANVAR will be shared by two newly created ministries, the Ministry of National Education in Charge of Scientific Research and Higher Education and the Ministry of Industry, Posts, Telecommunications and Tourism.

Scientific Research Policy

Recent French press reports also discuss changes in scientific research policy. LE MONDE cites "directives" recently given by Prime Minister Jacques Chirac to his cabinet ministers concerning preparation of the 1987 state budget. Chirac says its "dominant theme will, of necessity, be disengagement of the State," thus indicating a policy of "letting companies be as autonomous as possible in determining the allocation of their resources."

(Translations of the above sources will appear in EUROPE REPORT: SCIENCE AND TEHCNOLOGY.)

Antwerp

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PREVIEWS

PREVIEWS is an annotated list of selected science and technology items being translated by FBIS. The list may also contain previously published items of wide consumer interest.

EUROPE REPORT: SCIENCE AND TECHNOLOGY

ADVANCED MATERIALS

SUPERALLOYS, ALUMINUM-LITHIUM ALLOYS EXHIBITED AT HANOVER

Low expansion, aluminum-lithium alloys by Inco Alloys International are described. (Paris AIR & COSMOS 14 Jun 86 p 21)

AEROSPACE

FRANCE STUDIES ADVANCED PROPULSION SYSTEMS

Air-breathing engines for air and spacecraft; SEP, SNECMA, Aerospatiale; six to seven years to prototype. (Paris AIR & COSMOS 7 Jun 86 p 54)

MATRA, MBB STUDY ARIANE EXTENDED STAGE

Designed for orbital rendezvous missions such as delivering construction modules for Columbus. (Paris AIR & COSMOS 7 Jun 86 p 50)

346 BILLION LIRE FOR DEVELOPMENT OF ITALSAT

First Italian telecom satellite; prime contractor Selenia Spazio; contract covers full development up to delivery for launch in early 1989. (Paris AIR & COSMOS 7 Jun 86 p 55)

CIVIL AVIATION

FRG'S MTU SHOWS SHROUDED DOUBLE PROPFAN AT AIR SHOW

CRISP (Counter-Rotating Integrated Shrouded Propfan) design is similar to Rolls-Royce propfan; two twelve-blade transsonic propellers driven by planetary reduction gear. (Paris AIR & COSMOS 7 Jun 86 p 20)

MBB, CHINA TO CODEVELOP NEW COMMUTER AIRCRAFT

Aircraft specifications, propfan engines; $1.2-1.3 billion development costs to be shared; market estimate; development timetable. (Paris AIR & COSMOS 14 Jun 86 p 13)

AIRBUS INDUSTRIE OFFICIALS MEET FOR DISCUSSIONS

Items on agenda: new A330, A340 programs, commercial relations with United States, expansion of consortium. (Paris AIR & COSMOS 14 Jun 86 p 9)

NORDIC AIRCRAFT INDUSTRY COLLABORATION: FOKKER 100, MD-11

Participants include Swedish Saab, Norwegian Raufoss Ammunisjonsfabrikker and ASV-group Nordisk Aluminium Fly, and Danish Per Udsen Aircraft Industri. (Stockholm DAGENS NYHETER 4 Jun 86 p 10)

COMPUTERS

MAY 1986 ECRC STATUS REPORT

Update on the ECRC (European Computer Industry Research Center); research in artificial intelligence; funding, personnel. Indication that ECRC will hold yearly seminars on its activities. (Paris LE MONDE 28 May 86 p 17)

FRG SUBSIDY TO 'SUPRENUM' DM 100 MILLION: FUTURE CHANCES

Participants include Krupp Atlas Elektronik, GMD (Society for Mathematics & Data Processing), Systemhas Stollman, Berlin University; 16 mips capability; 250 parallel processors; grid process; applications include aerodynamics, meteorology, plasma physics, microelectronics, geology. (Duesseldorf WIRTSHAFTSWOCHE 9 May 86 pp 68, 72)

DEFENSE INDUSTRIES

FRENCH, FRG COMPANIES TO DEVELOP INTEGRATED AVIONICS PACKAGE

Strategy to compete with dominant US manufacturers. (Paris AIR & COSMOS 14 Jun 86 p 23)

MICROELECTRONICS

FRG RESEARCH ON NEW PROCESS FOR SUBMICRON CHIP

University of Ruhr at Bochum is developing a "flexible emitter base self-adjustment process." Technology includes various superimposed layers and reactive ion etching. (Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHART 2 Jun 86 p 7)

SCIENTIFIC & INDUSTRIAL POLICY

SWISS PARTICIPATION IN EUREKA OUTLINED

Companies, institutions, principal projects named. (Geneve JOURNAL DE GENEVE 28 Apr 86 p 3)

LATIN AMERICA REPORT: BRAZIL

PROTECTIONISM CAUSES DISSENSION WITHIN ADMINISTRATION

Fourteen related articles examine dissension in Brazilian government, business, scientific, and academic circles over the issue of protectionism in the computer software industry. (Primarily from Sao Paulo O ESTADO DE SAO PAULO, mid-May to mid-June)

USSR REPORT: CHEMISTRY

NEW MEMBRANE CATALYSTS FOR LOW-TONNAGE CHEMISTRY

Progress is reported toward domestic Soviet production of membrane catalysts, used in the production of low-tonnage chemicals which now have to be purchased abroad. Some 58 authors' certificates (a form of patent) have been issued by Soviet institutes. Production, however, is still in the future. For previous reporting on this subject, see the FBIS Foreign Press Note of 16 September 1985: "USSR: Chemical Industry Shortcomings Revealed in Press." (Moscow VESTNIK AKADEMII NAUK SSR No 3, Mar 86 pp 21-25)